MARINE GEOLOGIC STUDIES IN THE BEAUFORT SEA, ALASKA, 1980; LOCATION, DATA TYPE, AND RECORDS OBTAINED

by

Ed Kempema
Erk Reimnitz
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OPEN-FILE REPORT
81-241

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MARINE GEOLOGIC STUDIES IN THE BEAUFORT SEA, ALASKA, 1980;

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U.S. Geological Survey, Menlo Park, California

The U.S.G.S. R/V KARLUK ran approximately 1500 km of trackline surveys on the inner shelf of the Beaufort Sea, Alaska, from July through September, 1980. In addition to the trackline surveys, 6 areas were investigated by SCUBA divers, 18 sites were studied using closed circuit television, and 80 sediment grab samples were collected. Six maps (plates 1 through 6) show the locations of tracklines, dive sites, underwater television runs, and sampling stations. Partial funding for this work was provided by the Bureau of Land Management; Outer Continental Shelf Environmental Assessment Program.

Ice and weather conditions were fair this year, and several important areas were studied in detail:

1) Emphasis was placed on gathering data in Harrison Bay (Plates 1 and 2) this season, and many lines were run in this area. Lines were run both nearshore and offshore. The offshore geophysical lines were run over a series of shoals in order to define shoal morphology and map the effects of the shoals on ice gouging and ice zonation. In conjunction with these surveys approximately 40 grab samples were collected to study the sediment distribution around the shoals and throughout Harrison Bay.

2) Detailed bathymetric surveys were run off Pingok (plate 2), Reindeer, Cross, and Stump Islands (plate 3) to gather data on arctic nearshore environments and processes and to study the roll of ice in the nearshore zone.

3) Geophysical lines were run in the Camden Bay and Barter Island area (plates 5 and 6). Lines were run offshore to gather ice gouging and geophysical data, and nearshore underwater television runs were made to search for additional boulder patches (Reimnitz and Ross, 1979).

On most survey lines positions were plotted using a Motorola Miniranger range-range navigation system with a distance measuring accuracy of $\pm$3 meters. On lines close to shore in zones where there was no Miniranger coverage, radar ranges were taken from available targets, and positions are accurate to $\pm$ 100 m. For offshore lines beyond the range of the Miniranger system, a combination of satellite navigation and dead reckoning were used. The satellite navigation system was a Magnavox model MX 1242, which provides position accuracies within 1/4 mile at best. Dead reckoning positions are accurate to within $\pm$1 mile. The ship's log included with this report contains navigational information for each particular line.

Bathymetry was recorded on a Raytheon RTT 1000 dry paper recorder using either a hull-mounted 200 kHz transducer with an 8° beam width, or a towed 200 kHz transducer with a 4° beam width (narrow beam). All records were corrected for draft of vessel or tow depth. A 7 kHz transducer used in conjunction with the RTT 1000 recorded subbottom reflectors up to 10 m below the sea floor. Deeper penetration high-resolution seismic data were recorded on an EPC Model 1400 recorder using 1/4 second sweep and firing rate with a 200 Joule EG&G Model 234 Uniboom as a sound source. The signal was filtered to approximately 600-1600 kHz.

The side-scan sonar records were taken using a Model 259-3 EG&G system and a Model 272 sonar fish operated with a 105 kHz 1/10 second pulse at a 20° beam angle depression.

Data acquired consist of approximately 1500 km of bathymetry and 7 kHz subbottom profiles, 950 km of side-scan sonar, and 830 km of high-resolution seismic records. The data is in the form of 46 rolls of bathymetry, 25 rolls of side-scan sonar, 14 rolls of high-resolution seismic records, 3 rolls of Simrad fathometer records, and the ship's log. The ship's log contains important information on systems in use on each line, systems settings (scale, filters, etc.), navigational data used in plotting the lines and information on unique observations or system difficulties. All data are available for inspection at the U.S. Geological Survey, Rm. B-164, Deer Creek Facility, 3475 Deer Creek Road, Palo Alto, California 94304. Copies of this report and the data are available from National Geophysical and Solar-Terrestrial Data Center, NOAA, Boulder, CO 80302.

The data presented here are currently being studied by the authors as part of a long-term study of the Beaufort Sea. The authors may be contacted for a bibliography of publications based on the above data and data from previous years.

References

Reimnitz, Erk, and Ross, Robin, 1979, Lag deposits of boulders in Stefansson Sound; Beaufort Sea, Alaska, U.S. Geological Survey Open-File Report no. 79-1205, 26 p.

DEPARTMENT OF THE INTERIOR
UNITED STATES GEOLOGICAL SURVE
71°
55'
50'
45'
40'
35'
152°30
25'
70°
45'
TRANSPONDER
SURVEY TARGET
Cape Halkett
HARRISON BAY
Pacific Shoal
START LINE 20
END LINE 20
START LINE 30
END LINE 30
START LINE 31
END LINE 31
END LINE 32
START LINE 33
END LINE 28
START LINE 29
END LINE 29
END LINE 54
START LINE 55
END LINE 55
5
10
15

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PLATE 1 of 6

71°

55'

50'

45'

END LINE 30
START LINE 31

END LINE 31

START LINE 33

END LINE 32

END LINE 28

START LINE 29

END LINE 34
START LINE 35

START LINE 34

START LINE 28

END LINE 33

END LINE 35

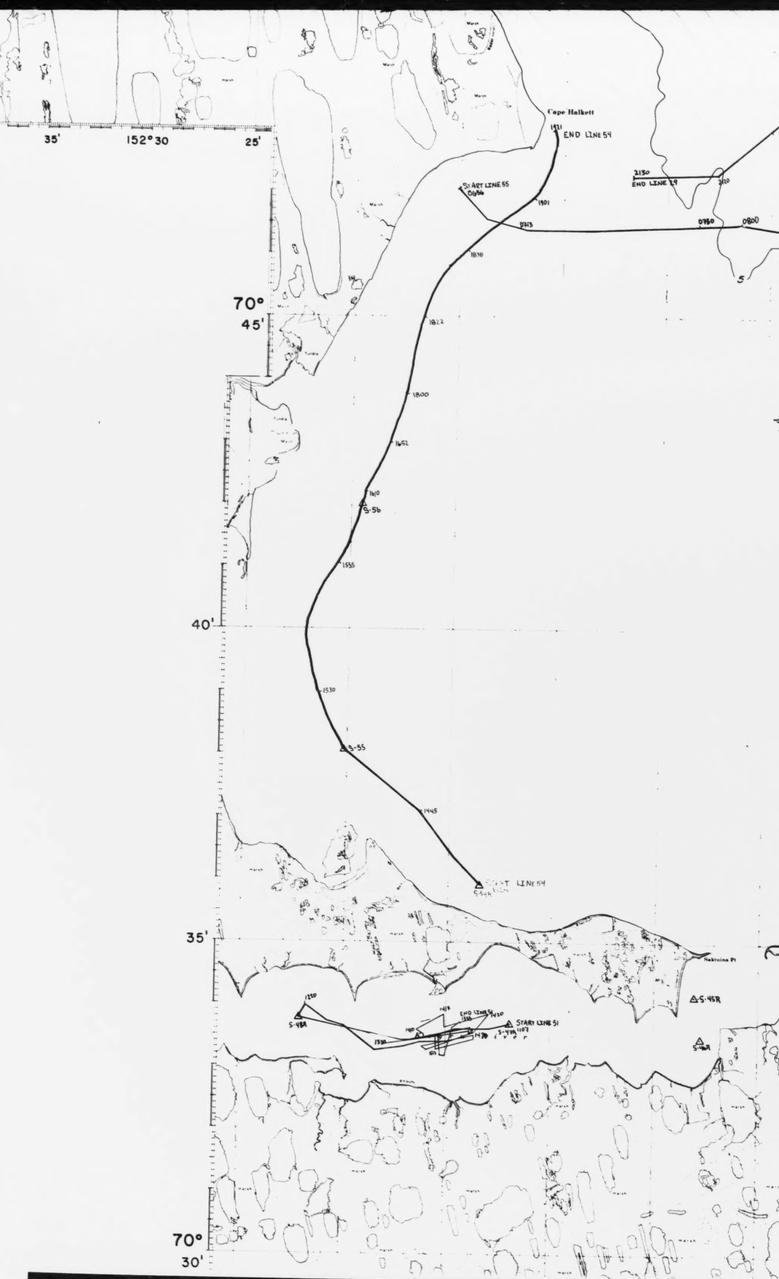
END LINE 54

START LINE 55

Cape Halkett

HARRISON BAY

Pacific Ocean



Base from C.&G.S. Charts, 1:50,000 series; 9467, 3rd Ed. June 10/68; 9468, 3rd. Ed. June 24/68; 9469, 3rd Ed. June 10/68; 9470, 3rd Ed. Aug 12/68; 9471 3rd Ed. June 10/68; 9472, 3rd Ed. June 10/68; 9473 3rd **Ed. June 24/68; Alaska - Artic Coast. Compiled, Base Map Unit, Menlo Park, 4-2-71 (3-36)**

Contours in meters

SCALE 1:80 000

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ALASKA

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HARRISON BAY

Pacific Sabol

START LINE 55
END LINE 59
END LINE 39
START LINE 21
END LINE 21
END LINE 35
END LINE 19
LINE 19 CONTINUED
START LINE 50
START LINE 54
START LINE 51
END LINE 53
START LINE 53
END LINE 53
TRANSPONDER
Nakaima Pt
Nakaima Islands
Midgeru Pt
S-45R

PLATE LOCATIONS
0 50 100 n.mi
UFORT SEA
PRUDHOE BAY
BARTER ISLAND
IRKTOK ER
UNITED STATES
CANADA
148°
144°
70°

Colville River Delta
Itkillik Channel
Kachemach Channel
Delta

45'
40'
35'
70° 30'
70° 25'
15' 10' 05' 152° 55' 50' 45' 40' 35' 151° 30' 25' 20' 15' 10' 05'
151° 55' 50' 45' 40' 35' 150° 30' 25'

SCALE 1:80000
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TRACKLINES
DIVE SITES
SEDIMENT SAMPLES

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DEPARTMENT O
UNITED STATES GE

70°
50'

45'

40'

35'

70°
30'

HARRISON BAY

END LINE 60

START LINE 23

START LINE 22

START LINE 60

END LINE 59

START LINE 59

END LINE 58

END LINE 18

START LINE 18

Pingok Island

TRANSPONDER

Simpson Lagoon

River Delta

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PLATE 2 of 6

70° 50'
45'
40'
35'
70° 30'

Cat Shoals
Loon Shoal
Simpson Lagoon
ON BAY
ISLANDS
Pingok Island
Cottle Island
Duck Island
Bodfish Island
Bartlett Island
Milne Pt
Kemik Pt
Beechey Pt
Oliktok Pt
OLIKTOK
TRANSPONDER
END LINE 60
START LINE 60
END LINE 59
START LINE 59
END LINE 58
START LINE 58
START LINE 57
END LINE 57
START LINE 56
END LINE 56
START LINE 55
END LINE 55
START LINE 54
END LINE 54
START LINE 53
END LINE 53
START LINE 52
END LINE 52
START LINE 51
END LINE 51
START LINE 50
END LINE 50
START LINE 49
END LINE 49
START LINE 48
END LINE 48
START LINE 47
END LINE 47
START LINE 46
END LINE 46

70° 50'

45'

40'

35'

70° 30'

05' 151° 55' 50' 45' 40' 35' 150° 30' 25' 20' 15' 10' 05' 150° 55' 50' 45' 40' 35' 149° 30' 25' 20'

HARRISON BAY

Simpson Lagoon

Colville River Delta

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SCALE 1:80000

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Contours in meters

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Contours in meters.

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Stefansson Sound

Prudhoe Bay

Simpson Lagoon

Midway Islands

Stockton Islands

Tapkaluk Islands

Mikkelsen Bay

Pingok Island

Niakogon Lagoon

Sagavanirktok River

Kadleroshilik River

Kuparuk River

Putuligayuk River

148°30' 25' 20' 15' 10' 05' 148° 55' 50' 45' 40' 35' 147°30' 25' 20' 15' 10' 05' 147° 55' 50' 146°45'

70°35' 30' 25' 20' 15' 10'

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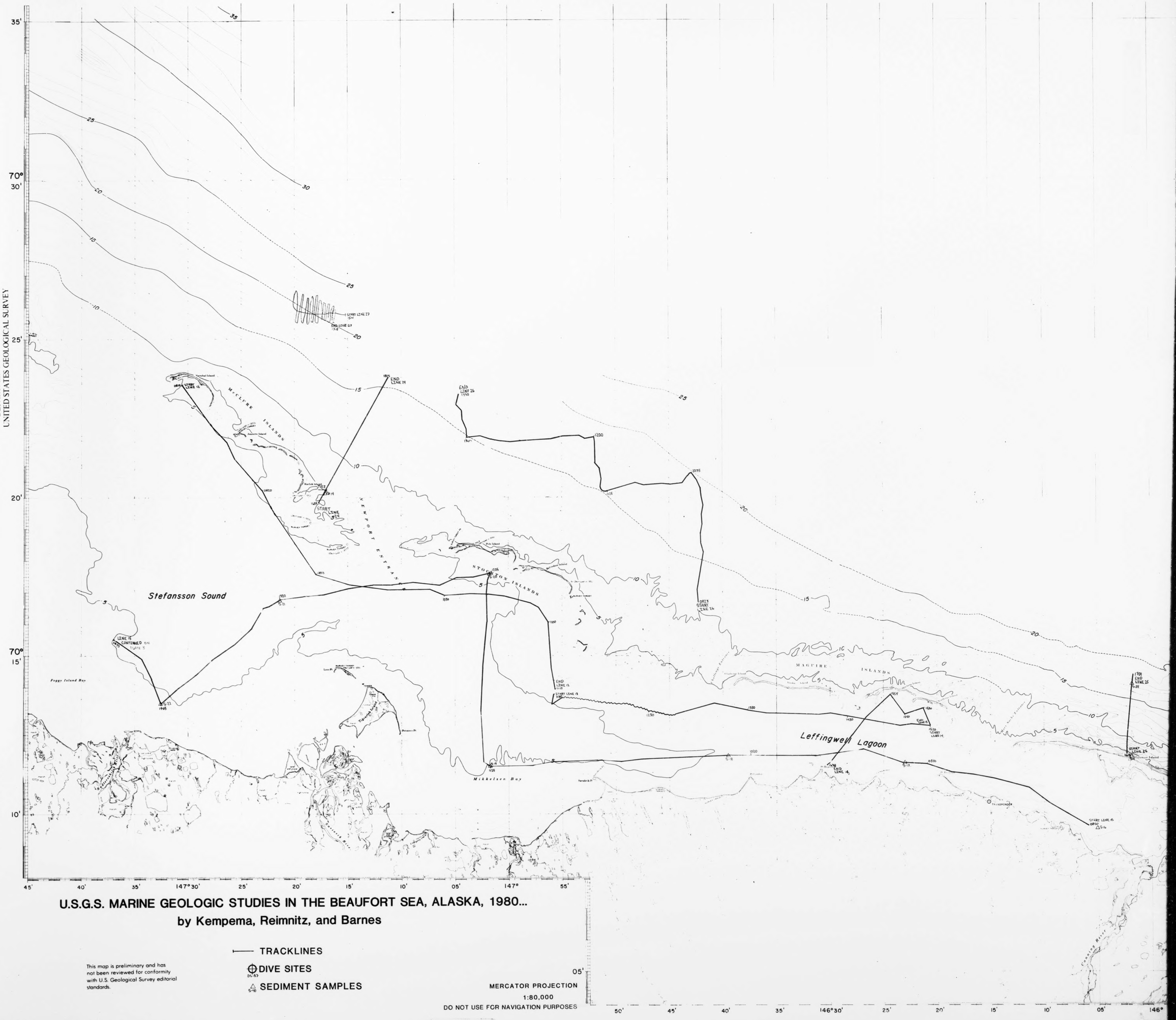

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SEDIMENT SAMPLES
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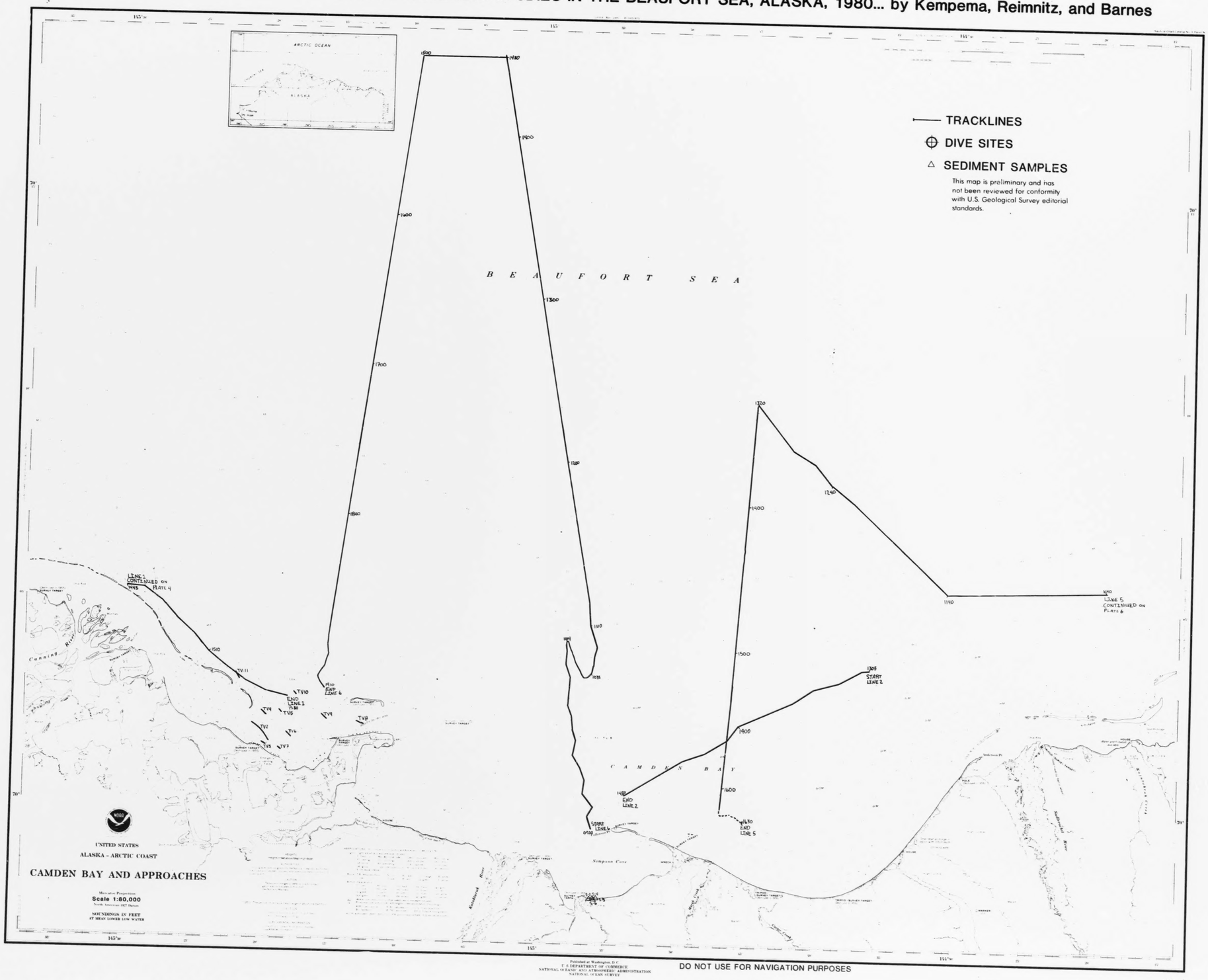

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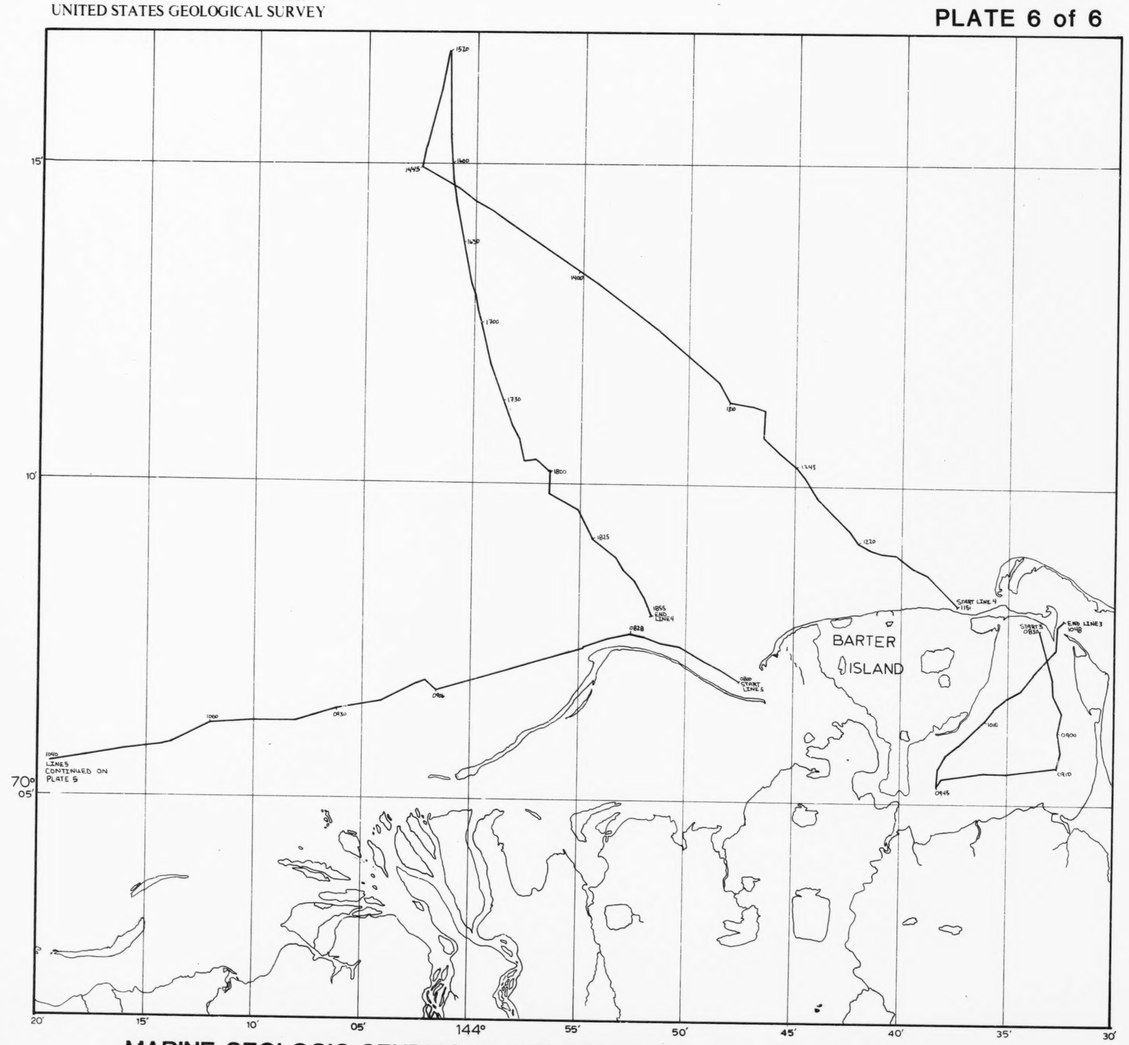

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